

REMARKS

As a preliminary matter, Applicants have amended the specification and claim 1, and inserted a new abstract to correct for informalities and place the application in conformance with U.S. practice. More specifically, Applicants amended claim 1 so that it reads better and to provide proper antecedent basis for the “at least one of the substrates” and the “predicted quantity”. Claim 1 is not amended to avoid the prior art.

Claims 1, 3-4, and 6 stand rejected under 35 U.S.C. 102(b) as being anticipated by Ishihara et al. (U.S. Patent No. 5,263,888). Applicants respectfully traverse the rejection because the cited reference does not disclose (or suggest) a step of dispensing liquid crystals which has a predicting step to predict an optimum quantity of liquid crystals that are encapsulated between two substrates and controls the quantity of dispensed liquid crystals based on the predicted quantity.

The Ishihara et al. reference is directed to a method of manufacturing a liquid crystal display panel that has a fixed number of drops of liquid crystal, or a mixture of liquid crystal and spacers, that are dropped at various positions on an electrode face of at least one of a pair of substrates. The drops of liquid crystal/resin mixture are deposited on the substrate 1b by means of a micro-syringe as a rectangular array pattern of a fixed number of drops arranged at 10mm intervals, with all of the drops being precisely identical in amount (see col. 4, lns. 33-38). The Ishihara et al. reference does not disclose a method of manufacturing a liquid crystal display that includes a predicting step in the dispensing step

that predicts an optimum quantity of liquid crystals encapsulated between two substrates, and controls quantity of dispense liquid crystals based on the predicted quantity. That is, drops are not dispensed in non-identical amounts as in the present invention. Rather, the Ishihara et al. reference discloses that if the diameter of the spacers is held fixed, and the total amount of liquid crystal that is dropped on a substrate 1b is varied, then certain conditions must be satisfied such that the total amount of liquid crystal/spacer that is dropped on to the substrate 1b must be controlled to be no greater than a value V_{\max} and no smaller than V_{\max} by 7% (col. 5, ln. 56 to col. 6, ln. 15).

In contrast, the present invention is not directed to predicting a total amount of liquid crystal between a pair of substrates. Instead, the present invention has a dispensing step which includes a predicting step that predicts an optimum quantity of liquid crystals that are encapsulated between the two substrates and controls the quantity of dispensed liquid crystals based on the predicted quantity. In this manner, drops can be dispensed in different amounts, unlike the Ishihara et al. reference. As described in Applicants' specification, the support post heights of columnar spacers is measured in advance at a dispense-injection step described using FIGs. 3A through 3C to allow the liquid crystal dispensing quantity to be controlled based on the measured value (see Applicants' specification pg. 12, Ins. 7-11). Specifically, the quantity of liquid crystal dispensed on the TFT substrate is controlled based on a height of the support post on the CF substrates which has been measured in advance using a laser displacement gauge 84 as illustrated in FIG. 7 (see Applicants' specification pg.

12, lns. 12-29). For example, when two liquid crystal display panels are fabricated from a single glass substrate, as a two-shot configuration to obtain two TFT substrates, the dispensing quantity for surface A and surface B is different for the respective shot dispensed by respective dispensers, such as dispensers 90, 92 shown in FIG. 8. Since the cited reference does not disclose a method of manufacturing a liquid crystal display that includes a step of dispensing liquid crystals by dispersing different amounts of drops and wherein the dispensing step has a predicting step that predicts an optimum quantity of liquid crystals encapsulated between two substrates and controls the quantity of dispensed liquid crystals based on the predicted quantity, the rejection to claim 1 is traversed.

Applicants respectfully traverse the rejection to claim 4 because the cited reference does not disclose (or suggest) a method of manufacturing a liquid crystal display that includes, among other things, a panel formed in the case of a multi-shot substrate. Since the Ishihara et al. reference does not disclose (or suggest) a method of manufacturing a liquid crystal display for a multi-shot substrate, withdrawal of the rejection to claim 4 is respectfully requested.

In addition, since claims 3-4 and 6 ultimately depend upon claim 1 they necessarily include all of the features of their associated independent claim plus additional features. Thus, Applicants submit that the §102 rejection of claims 3-4 and 6 have also been overcome for the same reasons mentioned above to overcome the rejections of independent

claim 1. Applicants respectfully request that the §102 rejection of claims 3-4 and 6 also be withdrawn for this additional reason.

Claim 2 stands rejected under 35 U.S.C. 103(a) as being obvious over Ishihara et al., in view of Shohara et al. (U.S. Patent No. 6,238,754). Applicants respectfully traverse the rejection for the reasons cited above with respect to the rejection of claim 1. More particularly, the cited references fail to disclose (or suggest) predicting an optimum quantity of liquid crystals by measuring a height of a columnar spacer that is provided to determine a cell thickness between two substrates. Since the cited references do not disclose a step of predicting an optimum quantity of liquid crystals, or predicting and optimum quantity by measuring a height of a columnar spacer, the rejection is traversed. In addition, claim 2 is considered allowable based on its chain of dependency from independent claim 1. Accordingly, withdrawal of the rejection to claim 2 is respectfully requested.


Claim 5 stands rejected under 35 U.S.C. 103(a) as being obvious over Ishihara et al. Applicants respectfully traverse the rejection because the cited reference fails to disclose (or suggest) the prediction of an optimum quantity of liquid crystals, and further that such prediction is carried out concurrently with a step of forming a main seal on either of the two substrates. As discussed above with respect to the rejection of independent claim 1, since the cited reference does not disclose a step of predicting an optimum quantity of liquid crystals, Applicants believe that concurrently combining the prediction step with another step is not disclosed (or suggested) by the Ishihara et al. reference. In addition, claim 5 is

considered allowable based on its chain of dependency from independent claim 1. Therefore, withdrawal of the rejection to claim 5 is respectfully requested.

For all of the above reasons, Applicants request reconsideration and allowance of the claimed invention. The Examiner should call Applicants attorney if an interview would expedite prosecution.

Respectfully submitted,

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